

Planform stability of embayed beaches along the east coast of Peninsular Malaysia

ABSTRACT

The presence of embayed beaches along the East coast of Peninsular Malaysia has proven the significant influence of wave variability due to the Northeast monsoon. These beaches, which some of them are among the popular beaches for tourism and recreational activities, have not been categorised according to its planform stability. Categorising this type of beach is a preliminary step towards the long-term shoreline management plan. This study presents the outputs of the application of the parabolic bay model to satellite images of the embayed beaches. It focuses on the determination of the total number of embayed beaches along the East coast of Peninsular Malaysia including identification of beach planform stability using the model of equilibrium bay beach (MEPBAY) program. The model was used as a tool to propose engineering solutions and to investigate the applicability of the existing coastal structures for the beach in dynamic or unstable state. MEPBAY analysis showed that out of 51 beaches - 26 of them are dynamic, 23 are static and another two are in unstable state of planform equilibrium. Beaches with static planform equilibrium include Batu Buruk beach, Irama beach, Resang cape, Jemaluang beach and Kg Punggai in which the beaches undergo no addition or erosion of sediment towards the bay and littoral drift of the beach is almost non-existent. Results presented indicated that beaches with dynamic equilibrium state was achieved when the shoreline experiences degradation or undergo erosion due to the changes in the equilibrium orientation and shoreline planform of the bay as shown by Senok beach, Jara beach, Sedili cape, Cherating beach, Endau-Rompin beach, Bukit Tengah beach, Kalung bay and Teluk Lipat beach. Unstable equilibrium embayed beaches on the other hand, is a condition when the curved planform of the beach experienced accretion in the lee accompanied by erosion downdrift as showed by the Tok Jembal beach. This condition is a result of wave sheltering or changes in the geometric configuration of the beach. The numerical modelling exercises through MEPBAY have given us an understanding on the variation of planform stability towards the embayed beaches morphodynamics.

Keyword: Dynamic equilibrium state; Long term empirical bay models; MEPBAY; Static equilibrium state; Unstable state